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EXAMINER

FISCHER, JUSTIN R

ART UNIT PAPER NUMBER

1733

DATE MAILED: 08/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/883,039

Applicant(s)

MERALDI, JEAN-PAUL

Examiner

Justin R Fischer

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) 17-27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 28-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3,8.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. Applicant's election without traverse of a tire containing at least one elongate composite element formed of fibers that are impregnated in a thermoset resin (claims 1-16 and 28-38) in Paper No. 9 is acknowledged is acknowledged.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-16 and 28-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi (JP 63134310) and optionally in view of Kikuchi (US 5,291,930). Takahashi is directed to a pneumatic tire construction having a belt reinforcement structure formed of "elongate composite elements" or cord-shaped fiber bundles containing a plurality of parallel, fiber filaments that are not twisted, wherein said elongate composite elements are impregnated with a thermosetting resin having a tensile modulus (analogous to modulus of claimed invention) of at least 150 kgf/mm² or 1.5 GPa. Takahashi suggests that a tire having the aforementioned belt reinforcement structure is lightweight and exhibits improved operating stability and rolling resistance (as compared to conventional, twisted cord reinforcement elements). Takahashi, however, fails to expressly define the claimed characteristics of the elongate composite element regarding the elastic deformation in compression and the breaking stress in

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compression, as compared to the breaking stress in extension. In any event, these properties are dependent on the particular resin and the particular fiber filaments used to manufacture the elongate composite element. In this instance, Takahashi discloses the use of a high modulus, thermosetting resin to form an elongate composite element in an analogous manner to that of the claimed invention, wherein the elongate composite element is preferably a belt-reinforcing element. As such, one of ordinary skill in the art at the time of the invention would have found it obvious to form the tire construction of Takahashi with an elongate composite element having the claimed properties since the elongate composite element of Takahashi is formed of a similar high modulus, thermosetting resin and would be expected to possess extremely similar properties as compared to the elongate composite element of the claimed invention, there being no evidence of any unique processing, other than choosing a high modulus, thermosetting resin, that results in the claimed elongate composite element. Kikuchi is optionally applied since it directly attributes enhanced compression modulus to the formation of an elongate composite element due to the use of an impregnating resin without twisting said elongate composite elements. Thus, Kikuchi recognizes improved compression properties due to this specific arrangement (elongate composite element) as compared to conventional twisted cords, such that one of ordinary skill in the art at the time of the invention would have readily appreciated the compression properties defined by the claimed invention. Lastly, applicant has not provided a conclusive showing of unexpected results to establish a criticality for the compression properties

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defined by the claimed invention. The details of Takahashi were obtained from the attached abstracts and an oral translation supplied by a USPTO translator.

Regarding claims 2 and 11, Takahashi suggests the use of a plurality of organic fiber materials, such as carbon fibers. While Takahashi fails to expressly suggest the use of glass fibers, one of ordinary skill in the art at the time of the invention would have found it obvious to use glass fibers in the elongate composite element of Takahashi since glass fibers represent a well-known, organic material used in tire reinforcing elements, including elongate composite elements. In particular, the use of glass fibers would be consistent with the desire of Takahashi to use a lightweight, high strength, and high modulus material in the elongate composite element.

Regarding claim 3, Takahashi suggests the use of a plurality of high modulus, thermosetting resins, such as phenolic resins, melamine resins, unsaturated polyester resins, and epoxy resins. Although Takahashi is silent as to the glass transition temperature of the resins, the resins described by Takahashi are extremely similar to those identified by the claimed invention in that they are high modulus thermosetting resins and one of ordinary skill in the art at the time of the invention would have been able to appropriately select a resin depending on the specific use of the elongate composite element (e.g. what size of tire, what end count). In this instance, many of the resins described by Takahashi would have a glass transition temperature greater than 130 degrees Celsius, there being no conclusive showing of unexpected results in the original disclosure to establish a criticality for such a resin ($T_g > 130^\circ\text{C}$).

With respect to claims 4, 12, 28, and 35 as previously stated, Takahashi teaches the use of a thermosetting resin having a modulus of at least 1.5 GPa, which encompasses the entire range of the claimed invention. In this same regard, there is no conclusive showing of unexpected results in the original disclosure to establish a criticality for any of the claimed ranges for the modulus.

Regarding claims 5 and 29, while Takahashi is silent as to the elastic deformation in extension and compression, Takahashi uses a similar, high modulus thermosetting resin to impregnate the elongate composite element, such that one would have expected the elongate composite element of Takahashi to have extremely similar properties as compared to that of the claimed invention. It is further noted that Takahashi suggests some exemplary fiber materials, including carbon fibers, which are identified by the claimed invention as a possible fiber material. Lastly, as previously stated, Kikuchi specifically attributes improved compression properties to an elongate composite configuration, as opposed to a conventional twisted structure.

With respect to claims 6 and 30, Takahashi describes the use of RFL, which is commonly used with tire reinforcing elements to improve adhesion with ply or topping rubbers.

Regarding claims 7-9 and 31-33, the elongate composite element of Takahashi is used as a belt reinforcing material, wherein said elements are disposed at equal and opposite angles (e.g. 20 degrees) in adjacent belt plies (example uses two belt plies- Pages 68 and 69).

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With respect to claims 10, 11, and 34, Takahashi suggests a weight of at least 15%, preferably at least 30%, for the thermosetting resin. This suggests a weight for the fiber content of less than or equal to 85% and a preferred weight for the fiber of less than or equal to 70%, which incorporates nearly the entire range of the claimed invention. Also, Takahashi suggests a specific gravity of density of less than 3.0.

Regarding claims 13 and 36, one of ordinary skill in the art at the time of the invention would have expected the elongate composite element of Takahashi to have the claimed breaking stress in compression (at least 0.7 GPa) since it is formed of a similar high modulus, thermosetting resin, a similar fiber material having the claimed density, and a similar fiber/resin ratio, as set forth above. It is further noted that as stated above, Kikuchi specifically attributes improved compression properties to an elongate composite configuration, as opposed to a conventional twisted structure.

With respect to claims 14, 15, 37, and 38, the elongate composite element of Takahashi is circular (cord-like bundle). Although there is no specific teaching as to the diameter of the elongate composite element, one of ordinary skill in the art at the time of the invention would have readily appreciated a diameter of at least 0.4 mm since the elongate composite elements are being used as reinforcing elements in belt reinforcement structures of trucks and buses where larger reinforcing elements are normally associated. It is further noted that a diameter of 0.4 mm is recognized as being a small diameter in the context of it being used in a belt reinforcement structure of a truck or bus, such that one of ordinary skill in the art at the time of the invention would

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have readily appreciated a diameter of at least 0.40 mm in the elongate composite element of Takahashi.

Regarding claim 16, one of ordinary skill in the art at the time of the invention would have expected the elongate composite element of Takahashi to have the claimed elastic deformation in compression (at least 3%) since it is formed of a similar high modulus, thermosetting resin, a similar fiber material having the claimed density, and a similar fiber/resin ratio, as set forth above. It is further noted that as stated above, Kikuchi specifically attributes improved compression properties to an elongate composite configuration, as opposed to a conventional twisted structure.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Inada (US 5,246,051) teaches the formation of an elongate composite comprising a plurality of fiber filaments that are impregnated with a thermoset resin and useable as a reinforcing element in a tire belt structure. In this instance, though, Inada suggests that a plurality of elongate composite elements are twisted together to form the belt reinforcing element- the reference fails to suggest the use of the elongate composite element (monofilament appearance) by itself as a reinforcement element

Thise-Fourgon (US 4,506,717), Takeuchi (US 6,068,916), Imai (US 5,151,142), and Moring (US 4,216,856) are cited to recognize the well-known use of similar elongate composite reinforcing elements in the reinforcement of elastomeric articles, including tires.

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5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Justin R Fischer** whose telephone number is **(703) 605-4397**. The examiner can normally be reached on M-F (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Ball can be reached on (703) 308-2058. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


Justin Fischer

August 14, 2003


Michael W. Ball
Supervisory Patent Examiner
Technology Center 1700